Research (What is it about?)	**Force resisting to penetration of a striker into dry and water-saturated sand**
UNN authors	*Bragov A., Balandin V., Igumnov, L., Kotov V., Lomunov, A.*
We find (The result)	New results of the dynamic behavior of dry and water-saturated sand, impacted and penetrated by cylindrical strikers with flat, hemispheric and conic heads at the velocities ***from 50 to 450 m/s***, are presented.
Abstract	As there are a lot of results describing kinematic and dynamic behavior in the process of fast moving bodies hitting dry sand. However, there are practically no research results concerning resistance forces arising when bodies penetrate water saturated soils. We present new experimental data on the resistance forces to penetration of strikers into dry and water-saturated sand, the results of mathematical modeling and computer simulation of the penetration of rigid cylindrical strikers into sandy soil with different moisture content. The dependences of forces resisting penetration into soil are determined using the ***inverse experiment*** technique, in which a container with sand impacts the end of a measuring bar with ***flat, hemispheric and conic*** heads. Based on the experimental-computational analysis of maximal and quasi-stationary values of the force resisting penetration of a flat-ended striker, parameters of dynamic compressibility and resistance to shear of compacted water-saturated sand are found. It is found that, when compacted sand is practically ***fully water-saturated***, its shearing properties ***degrade*** but remain substantial in the practically important range of impact interaction velocities. In the studied velocity range, the experimental results for the sand with the moisture content of 0 and 10% are practically the same, whereas they considerably differ for the sand with 20% moisture content. The maximum resistance forces for this sand ***are 1.5–2.0 times less*** than for the dry one.

Representative articles 2017-2018, quartiles	1. *Bragov A.M., Balandin V.V., Igumnov, L.A., Kotov V.L., Kruszka L., Lomunov, A.K.* Impact and penetration of cylindrical bodies into dry and water-saturated sand. Intern. J. Impact Engin. **122**. 197-208 (2018).	Q1, Q1
	Q-index (Qi) for the result	**4**
	high blue	

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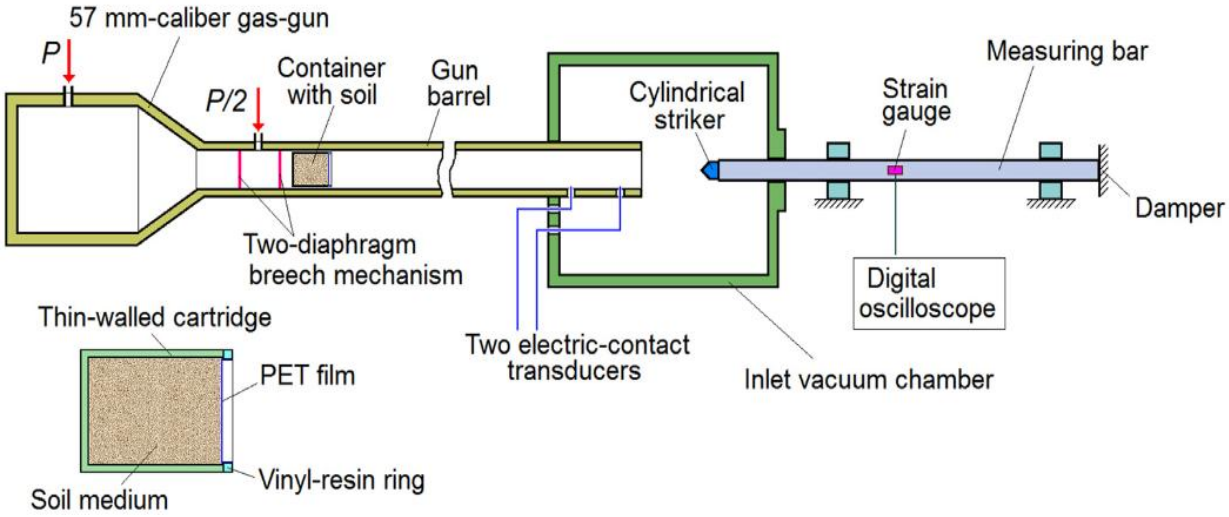
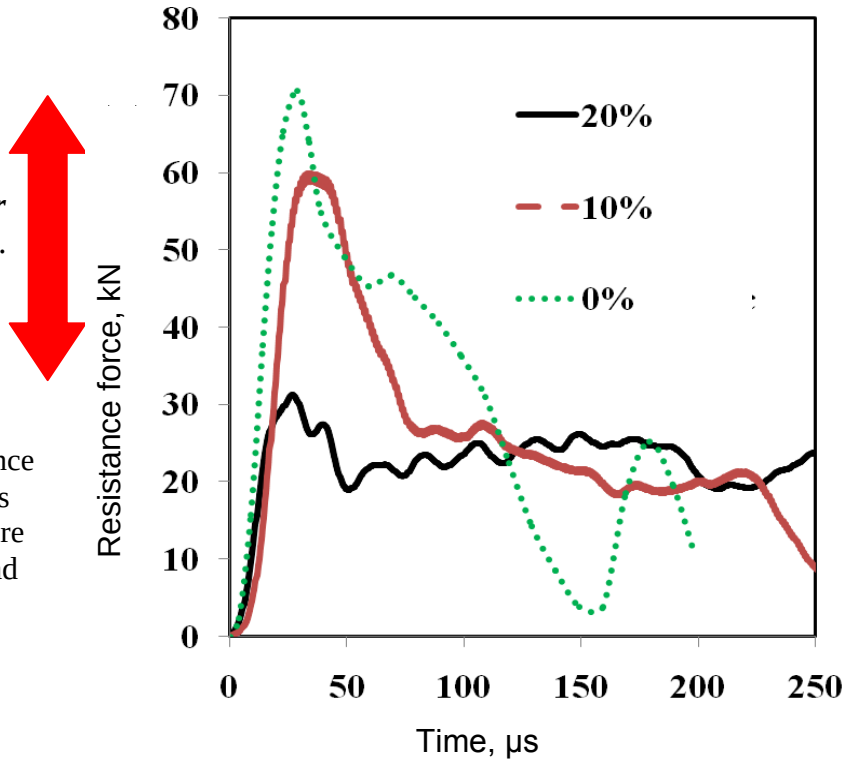
… and it bumps into the ground.

Schematic representation of the setup for measuring forces resisting penetration in the ***inverse experiment***.



The effect of ***water saturation***.



Comparison of the resistance force dynamics for 250 m/s velocity at different moisture contents (***hemispheric*** head striker).